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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/725,607	12/02/2003	Roger Akers	SYNT-P003US	4955

7590 06/15/2007  
Elizabeth R. Hall & Associates, P.C.  
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Houston, TX 77006-1718

EXAMINER
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BOWERS, NATHAN ANDREW

ART UNIT	PAPER NUMBER
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1744

MAIL DATE	DELIVERY MODE
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06/15/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/725,607	Applicant(s) AKERS ET AL.	
	Examiner Nathan A. Bowers	Art Unit 1744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 16 April 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 20-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>120204</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of Group I, claims 1-20 in the reply filed on 16 April 2007 is acknowledged.

Claims 21 and 22 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 16 April 2007.

During a telephone conversation with Elizabeth Hall on 31 May 2007, Species I, claims 1-19 was elected without traverse. Affirmation of this election must be made by applicant in replying to this Office action. Claim 20 is withdrawn from further consideration by the examiner as being drawn to a non-elected species.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

- 1) Claims 1-3, 10-14, 18 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Schwarz (US 5026650).

With respect to claims 1, 10 and 11, Schwarz discloses a culture chamber comprising a tubular housing (Figure 3:22), a growth compartment within the housing, a fluid inlet (Figure 2:30) and a fluid outlet (Figure 2:36). Specifically, Schwarz teaches

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that the bioreactor is designed to facilitate the movement of gases through the fluid inlet and outlet. This is described in column 3, lines 33-59 and column 5, lines 15-63. A support cylinder (Figure 2:32) having a first end in communication with the fluid inlet and a second end in communication with the fluid outlet is provided within the housing, and a membrane (Figure 2:40) is secured to the exterior surface of the support cylinder. Since the membrane is permeable only to gases, it is understood that it must be a molecular cut-off membrane characterized by a small pore size. Schwarz teaches that gases such as oxygen are continuously throughput through the membrane and disbursed into the fluid medium within the housing *along the length of the membrane*. Accordingly, a chamber must exist between the exterior surface of the cylinder and the interior surface of the membrane that is capable of accommodating the input gases.

With respect to claims 2 and 12, Schwarz discloses the apparatus in claim 1 wherein the housing is generally cylindrical in shape and symmetrical. This is clear from the Figures.

With respect to claims 3 and 18, Schwarz discloses the apparatus as described above wherein the housing comprises a right circular cylindrical sleeve (Figure 2:22) having a first and second end. First and second end fittings (Figure 1:20) sealingly fit within the bore of the sleeve and each include an interior projection. The end fittings include nozzles connected to through bores capable of adding and removing gases, as well as counterbores capable of holding the support cylinder.

With respect to claims 13 and 14, Schwarz discloses the apparatus in claim 3 wherein the support cylinder has an axial blind hole in the first and second end of the

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cylinder. Clearly, there is a fluid passageway in the cylinder capable of delivering fluids to the culture chamber from the through bores of the end fittings. The axial blind holes are in communication with radial cross holes (Figure 2:37 and Figure 2:33) extending to the exterior surface of the cylinder. This is described in column 5, lines 15-52.

With respect to claim 19, Schwarz discloses the apparatus as previously described above. In addition, Schwarz indicates that the membrane carrier assembly includes a support cylinder comprising first and second end plugs (Figure 2:35a). The end plugs have a through hole in communication with the through bore of the housing end fittings, and are positioned within the counterbores of the end fittings. See Figure 2.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2) Claims 1, 2, 7, 8 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwarz (US 5155035) in view of Bauer (US 6107055).

With respect to claims 1, 10 and 11, Schwarz discloses a culture chamber comprising a tubular housing (Figure 3:20), a growth compartment (Figure 3:30) within the housing, a fluid inlet (Figure 2:67) and a fluid outlet (Figure 2:86). A membrane carrier assembly transversing the growth compartment is additionally provided. The carrier assembly includes a support cylinder divided into a first end (Figure 2:23) and a second end (Figure 2:25). The first end is in communication with the fluid inlet, and the second end is in communication with the fluid outlet. A filter (Figure 2:35) is secured to the exterior surface of the support cylinder in order to form a chamber (Figure 2:85) between the exterior surface of the cylinder and the interior surface of the membrane. This is described in column 7, line 36 to column 8, line 62. However, it is not clear if the filter disclosed by Schwarz is a molecular weight cut-off membrane.

Bauer discloses a culture chamber comprising a plurality of molecular weight cut-off membranes (Figure 1:10 and Figure 1:7) that are used to separate valuable cell products from the rest of the fermentation solution. This is described in column 1, lines 46-67, column 4, lines 18-26 and column 5, lines 17-46. Bauer indicates that only compounds of 100,000 daltons or less are allowed to perfuse through the membranes.

Schwarz and Bauer are analogous art because they are from the same field of endeavor regarding cell culture chambers.

At the time of the invention, it would have been obvious to ensure that the filter disclosed by Schwarz is a molecular cut-off membrane similar in design to those described by Bauer. Bauer teaches that molecular cut-off membranes are useful in collecting valuable cell products, removing wastes, and retaining cells within the culture chamber. As evidenced by Bauer, the use of separation membranes in cell culture apparatuses is well known in the art, and it would have been apparent to implement them in the construction of Schwarz's bioreactor.

With respect to claims 2 and 12, Schwarz and Bauer disclose the apparatus set forth in claim 1 as set forth in the 35 U.S.C. 103 rejection above. It is clear from the Figures that the bioreactor of Schwarz is generally cylindrical and symmetrical in shape.

With respect to claims 7 and 8, Schwarz and Bauer disclose the apparatus set forth in claim 1 as set forth in the 35 U.S.C. 103 rejection above. In addition, Schwarz teaches that the fluid inlet and outlets are connected to the housing through fluid

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conducting swivels. In column 7, line 49 to column 8, line 28, Schwarz teaches that the support cylinder is mounted to the housing in a rotatable fashion.

3) Claims 3-6, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwarz (US 5155035) in view of Bauer (US 6107055) and further in view of Schwarz (US 5026650).

With respect to claims 3, 18 and 19, Schwarz '035 and Bauer disclose the apparatus as previously described in the 35 U.S.C. 103 rejections above, however do not expressly indicate that the housing and support cylinder each have respective first and second end cap fittings.

Schwarz '650 discloses the apparatus as previously described above. Schwarz teaches that the apparatus includes first and second end fittings (Figure 1:20) sealingly fit within the bore of the sleeve and each include an interior projection. The end fittings include nozzles connected to through bores capable of adding and removing gases, as well as counterbores capable of holding the support cylinder. Schwarz additionally indicates that the membrane carrier assembly includes a support cylinder comprising first and second end plugs (Figure 2:35a). The end plugs have a through hole in communication with the through bore of the housing end fittings, and are positioned within the counterbores of the end fittings. See Figure 2.

Schwarz '035, Bauer and Schwarz '650 are analogous art because they are from the same field of endeavor regarding cell culture apparatuses.



At the time of the invention, it would have been obvious to provide the housing and support cylinder disclosed by Schwarz '035 each with end caps members and associated connecting means. Schwarz '650 indicates that end caps are beneficial because they can be fitted with through bores useful in the transport of fluids to and from the interior of the vessel. Schwarz '650 also indicates that the end caps of the cylinder support can be fitted within bores of the housing end caps to ensure that the cylinder support is securely attached to the remainder of the housing structure. The implementation of end caps and corresponding bores would not require significant structural design set forth by Schwarz '035.

With respect to claims 4-6, Schwarz '035, Bauer and Schwarz '650 disclose the apparatus set forth in claim 3 as set forth in the 35 U.S.C. 103 rejection above. In addition, Schwarz '035 indicates in column 14, lines 15-25 that a venting port is used to purge gases from the culture chamber. These ports are also fully capable of being used to transfer fluids to and from the housing.

4) Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schwarz (US 5155035) in view of Bauer (US 6107055) as applied to claim 1, and further in view of Falkenberg (US 5576211).

Schwarz and Bauer disclose the apparatus set forth in claim 1 as set forth in the 35 U.S.C. 103 rejection above, however do not expressly disclose that the molecular weight cut-off membrane is dialysis tubing.

Falkenberg discloses a culture vessel comprising a tubular housing that contains a dialysis tubing membrane (Figure 5:22). Column 7, lines 22-56 indicate that the dialysis tubing retains the cell culture while allowing the diffusion of nutrients and gases.

Schwarz, Bauer and Falkenberg are analogous art because they are from the same field of endeavor regarding cell culture systems.

At the time of the invention, it would have been obvious to ensure that the membrane used in the system of Schwarz was a dialysis tubing membrane. Falkenberg teaches that dialysis tubing is beneficial because it allows metabolic cell products to be removed from the culture system while retaining the remainder of the culture solution. One of ordinary skill would understand that the molecular weight cut-off membrane set forth by Bauer, the filter disclosed by Schwarz, and the dialysis tubing described by Falkenberg are all functionally equivalent separation devices, and that it would have been apparent to interchange Schwarz's filter with either of these membranes. Furthermore, the use of dialysis tubing is considered to be well known in the art.

5) Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwarz (US 5026650) as applied to claim 14, and further in view of Kersten (US 6228607).

Schwarz discloses the apparatus set forth in claim 14 as set forth in the 35 U.S.C. 102 rejection above, however does not expressly indicate that each radial cross hole intersects a surface pocket on the exterior surface of the cylinder.

Kersten discloses a bioreactor in which a plurality of surface pocket grooves (Figure 8:204) are provided upon the exterior surface of a substrate (Figure 8:201). In column 6, lines 10-26, Kersten states that the pockets serve to distribute gases through the bioreactor.

Schwarz and Kersten are analogous art because they are from the same field of endeavor regarding cell culture systems.

At the time of the invention, it would have been obvious to include arcuate surface pockets on the exterior surface of the support cylinder disclosed by Schwarz. As evidenced by Kersten, these surface pocket grooves would have worked to evenly distribute gas across the permeable membrane and into the cell culture. The addition of grooves to the surface of Schwarz's cylinder would require only minor structural alterations.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to

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be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-3, 18 and 19 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 7,144,727. Although the conflicting claims are not identical, they are not patentably distinct from each other because U.S. Patent No. 7,144,727 includes key limitations regarding a tubular housing, fluid inlet, fluid outlet, support cylinder, and molecular weight cut-off membrane. The instant application is generic to the claims of U.S. Patent No. 7,144,727 because U.S. Patent No. 7,144,727 includes additional limitations regarding a second culture compartment.

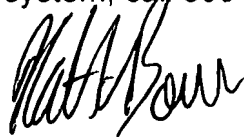
### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan A. Bowers whose telephone number is (571) 272-8613. The examiner can normally be reached on Monday-Friday 8 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gladys Corcoran can be reached on (571) 272-1214. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



NAB

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